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Notice of Allowability	Application No.	Applicant(s)	
	10/787,420	WESTRA, MITCHELL K.	
	Examiner	Art Unit	
	Eric B. Compton	3726	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to an application filed 26 February 2004.
2. ☒ The allowed claim(s) is/are 1-6.
3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) ☐ All b) ☐ Some* c) ☐ None of the:
 1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
 - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
 - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
 - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.

Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

- | | |
|---|--|
| <ol style="list-style-type: none"> 1. <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) 2. <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) 3. <input checked="" type="checkbox"/> Information Disclosure Statements (PTO-1449 or PTO/SB/08),
Paper No./Mail Date _____ 4. <input type="checkbox"/> Examiner's Comment Regarding Requirement for Deposit
of Biological Material | <ol style="list-style-type: none"> 5. <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) 6. <input type="checkbox"/> Interview Summary (PTO-413),
Paper No./Mail Date _____ 7. <input type="checkbox"/> Examiner's Amendment/Comment 8. <input checked="" type="checkbox"/> Examiner's Statement of Reasons for Allowance 9. <input type="checkbox"/> Other _____ |
|---|--|

Eric B. Compton
 Primary Examiner
 Art Unit: 3726

DETAILED ACTION

Allowable Subject Matter

1. Claims 1-6 are allowed.
2. The following is an examiner's statement of reasons for allowance: the prior art of record does not teach or suggest a method of making a scruff resistant engine cylinder liner comprising the steps of: case hardening the upper bore and at least one portion of the blended port relief area through induction heating to hardening temperature, and case hardening at least the port are through laser heating of the port area and subsequent ambient cooling, in combination with the other claimed subject matter.
3. The most pertinent prior art of record are U.S. Pats. 4,393,821 to Urano; 4,093,842 to Scott & 4,017,708 to Engel et al.
4. Urano discloses a method for hardening surface layers of a cylinder liner. The reference notes with respect to the then prior art that areas adjacent to the case hardened zones create a friction step resulting in unwanted blow-by, which even laser hardening alone could not prevent. See Col. 1, lines 38-56. The reference recommends maintaining dimensional relationships between hardened layers and piston ring. See Col. 2, lines 40-59. "The above-described hardened layers of the liner according to the invention can be provided by hardening the inner wall surface of the liner utilizing an induction type heating technique or by covering the surface with sprayed layers. However, it is most suitable to form the hardened layer by irradiating the inner wall surface of the liner with a laser beam as hardened layers formed by laser beam have precise dimension and a very small width." Col. 2, lines 61-69. Furthermore, the

reference notes drawbacks with the dimensions of laser hardening alone and recommends, "Hardened layers can be provided for a liner in a large engine having the above-described with and depth by employing heat-induction hardening or spraying as well as laser beam hardening." Col. 3, lines 16-19. The reference does not disclose use with ported cylinder liners though. Thus, the reference does not disclose case hardening the upper bore and at least one portion of the blended port relief areas through induction heating, and case hardening at least the port area through laser heating.

5. Scott discloses a method for hardening surface layers of a cylinder liner. The reference recognizes drawbacks with induction hardening and recommends laser hardening. First, a coolant jacketed cast iron cylinder liner including ports is provided. See Figure 1. Next, the inner surfaces of the upper and lower bore portions are machined. See Col. 3, lines 20-22. "In the present instance, the port relief area of a cylinder is fully case hardened through localized heating and ambient cooling of the surface, the heating being accomplished by a traversed laser beam, which is moved along the liner surface in a combination of orbital and axial motion to form a helical pattern 52 covering the port relief area." Col. 4, lines 12-19. "In addition to reduction of scuffing and scoring problems, it is recognized that wear in the upper cylinder line bore can be reduce and the life of the cylinder liners correspondingly extended by providing a hardened surface over the area contacted by the piston rings. This can be accomplished by the same laser hardening method used to case harden the port relief area." Col 4, lines 42-48. The reference expressly teaches away from using induction heating. See Col. 4, lines 34-41. Thus, the reference the reference does not disclose

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case hardening the upper bore and at least one portion of the blended port relief areas through induction heating, and case hardening at least the port area through laser heating.

6. Engel is similar to Scott. The reference recognizes the drawbacks of induction heating and also recommends only using laser hardening. Thus, the reference the reference does not disclose case hardening the upper bore and at least one portion of the blended port relief areas through induction heating, and case hardening at least the port area through laser heating.


7. Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Eric B. Compton whose telephone number is (571) 272-4527. The examiner can normally be reached on M-F 9-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David P. Bryant can be reached on (571) 272-4526. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.


Eric B. Compton
Primary Examiner
Art Unit 3726

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